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PATENT APPLICATION

IN THE UNITED STATES PATENT AND TRADEMARK OFFICE

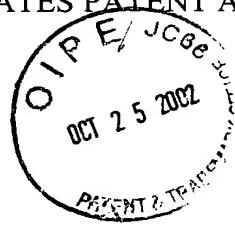
In re the Application of

Alain BETHUNE

Application No.: 09/330,134

Filed: June 11, 1999

For: A METHOD AND APPARATUS FOR APPLYING A COATING SUCH AS A PAINT  
OR VARNISH



Group Art Unit: 1762

Examiner: K. Crockford

Docket No.: 103602

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SUBMISSION OF ACCURATE TRANSLATION OF PRIORITY DOCUMENT

Director of the U.S. Patent and Trademark Office  
Washington, D.C. 20231

Sir:

Further to the Amendment filed October 21, 2002, Applicant submits the attached accurate translation of the priority application (i.e. French Patent Application No. 98 08544 filed July 3, 1998) for the above-identified U.S. Patent Application.

Should the Examiner have any further questions or comments on this matter, the Examiner is requested to contact the undersigned at the telephone number listed at the telephone below.

Respectfully submitted,



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**ENGLISH TRANSLATION OF FRENCH PATENT APPLICATION**

**NO. 98 08544**



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The present invention relates to a method and apparatus for applying a coating such as a paint or a varnish on an article having at least one substantially plane or slightly convex surface.

It is well known to cover the surface of an article of plastics material in a 5 varnish that is designed, for example, to protect decoration provided thereon.

In conventional manner, the varnish is sprayed by means of a spray gun in a painting or varnishing station.

That method requires the use of paints or varnishes that need to be diluted in solvents, which solvents must be eliminated prior to polymerization.

10 Such elimination by evaporation is harmful to the environment.

In addition, the painting or varnishing station is generally situated at a location that is remote from the station where molding takes place, so while the article is being conveyed to the painting or varnishing station, it is exposed to being dirtied, and in some cases there is a risk of the decoration formed thereon being damaged.

15 There thus exists a need to reduce loss of varnish and to facilitate the operation of varnishing, and more generally to perform the operation of depositing a coating such as paint or varnish on an article in a manner that is more effective.

20 The present invention provides a novel method of applying a coating such as paint or varnish on an article having at least one substantially plane or slightly convex surface, in particular an article made of molded plastics material.

The method includes the operations consisting in:

- depositing a predetermined quantity of coating in the fluid state on the center of a surface of the article, and spreading it by causing the article to revolve,

- applying directly the coating on at least a portion of the remainder of the surface of the article.

These two operations can begin simultaneously or they can be performed one after the other, in whichever order is most suitable for the shape of the article that 5 is to be painted or varnished.

The term "a surface which is substantially plane or slightly convex" is used to designate any surface which can be covered by spreading under the effect of centrifugal force spreading a coating deposited in the center thereof.

By means of the invention, the coating is deposited on a portion of the 10 surface of the article, i.e. which is substantially plane or slightly convex, without needing prior dispersion in the atmosphere in the form of fine droplets.

The invention thus makes it possible to reduce the quantity of paint and varnish that comes into contact with the atmosphere, and thus to reduce losses of solvent by evaporation.

15 The invention also makes it possible to use a conventional varnish or paint that does not have organic solvents.

The coating can further be applied automatically in a closed enclosure, close to the molding station, since said enclosure is more compact than are traditional installations.

20 This reduces the extent to which the article is at risk during transport of possible dirtying and of damage to decoration on the article, if any.

The coating can be applied by means of a spray or by any other means, over the entire surface of the article that is not covered by the coating spreading under the effect of centrifugal force.

The invention also provides an apparatus for applying a coating on an article having at least one surface that is substantially plane or slightly convex, the apparatus comprising:

- a rotary support for rotating the article;
- 5 - a dispenser member for depositing a predetermined quantity of coating in the fluid state on a predetermined location of said surface; and
- means for applying the coating directly on at least a portion of the surface of the article that is not covered by the coating being spread under the effect of centrifugal force.

10 The apparatus preferably further has an enclosure within which the article is rotated.

Also preferably, the means for applying the coating directly on the article comprise a nozzle whose inclination and positioning relative to the rotary support are adjustable.

15 When the paint or varnish used can be cured under the action of ultraviolet radiation, the apparatus further includes means for exposing the article to ultraviolet radiation inside the enclosure.

The invention is particularly suitable for applying a coating to a container lid or a stopper.

20 The coating is then spread on the substantially plane or slightly convex surface forming the top of the lid or the stopper by means of the centrifugal force and deposited on the sides of the lid or the stopper by means of a spray for example.

When the article has an outside surface that is substantially plane or slightly convex that is generally rectangular in shape when observed from above at the

time when it is rotated to spread the coating under the effect of centrifugal force, the means for applying the coating directly to the remainder of the surface of the article advantageously include a downwardly-sloping nozzle situated slightly above the periphery of said substantially plane or slightly convex surface.

5 It has been observed, quite surprisingly, that the invention makes it possible to paint or varnish in satisfactory manner articles that are not circularly symmetrical, and in particular lids of rectangular shape.

It has been found that by applying the paint or varnish in the form of a jet or a spray to the sides of the lid, it is possible when the nozzle is suitably placed to 10 cover the corners of the lid which are not reached by the paint or varnish spreading under the effect of centrifugal force, but without that giving rise to excess paint or varnish at any location on the surface of the article.

The invention also provides a painted or varnished article having a surface substantially plane or slightly convex covered in a coating spread under the effect of 15 centrifugal force and at least a portion of its surface which is covered by a coating that is deposited by direct application, e.g. by means of a spray.

The invention will better understood on reading the following description and on examining the accompanying drawings, in which:

- Figure 1 is a diagrammatic elevation view of a device for implementing 20 the method of the invention;
- Figures 2 and 3 show respectively the operations of depositing the coating by means of a spray on the sides of the article and dispensing a drop of paint or varnish in the center of its substantially plane surface;

- Figure 4 shows the coating spreading under the effect of centrifugal force; and
- Figure 5 represents the article coated in this way being exposed to ultraviolet radiation.

5 Figure 1 shows apparatus 1 for applying a coating such as a paint or a varnish to an article 2.

In this case, the article 2 is constituted by the lid of a makeup container that is generally rectangular in shape.

10 The top 3 of the lid 2 is substantially plane and horizontal, and its sides 4 are substantially vertical and they extend downwards.

The top 3 of the lid 2 could also be outwardly convex, for example.

15 The apparatus 1 comprises firstly a dispenser member 5 enabling a drop of paint or varnish to be deposited on the center of the surface constituting the top 3 of the lid 2, and secondly means for applying paint or varnish directly to the sides 4 of the lid 2 and in its corners, said means being constituted by a spray nozzle 6 as shown, for example.

The apparatus 1 also has means 7 for supporting the lid 2 and capable of rotating it about a vertical axis of rotation X.

The lid 2 rotates inside an enclosure that is not shown.

20 Preferably, paint or varnish is initially sprayed by means of the spray nozzle 6 on the side surface of the article 2 so as to cover its sides 4, as shown in Figure 2.

During this spray operation, which is short and lasts for less than half a second in the example described, the article 2 is rotated about the axis X to perform one revolution.

5 The nozzle 6 slopes slightly obliquely downwards and is situated slightly above the lid 2 so as to be able to reach its corners.

When application by means of the nozzle 6 comes to an end, and the lid 2 is still rotated, the dispenser member 5 is used to deposit a drop of paint or varnish on the center of the plane surface of the lid.

Under the effect of centrifugal force, the drop spreads out and 10 progressively covers the top 3 of the lid, as shown in Figure 4.

After a certain amount of time, the regions covered by the spreading of the drop of paint or varnish meet the regions already covered by spraying by the nozzle 6, and as a result the outside surface of the lid 2 is entirely covered in paint or varnish and the junction between the regions respectively painted or varnished by the effect of 15 centrifugal force and by the nozzle 6 is not easily discernible.

Preferably, the paint or varnish without solvent that is used is one that is capable of being cured under the action of ultraviolet radiation.

Once the paint or the varnish has been deposited, the lid is kept rotating and it is subjected to ultraviolet radiation 8 to cause curing to take place, as 20 represented in Figure 5.

Naturally, the invention is not limited to the painting or vanishing of a make-up container lid and relates more generally to any article having a substantially plane or slightly convex surface.

The invention makes it easy to deposit paint or varnish on an article to a thickness lying in the range 3  $\mu\text{m}$  to 30  $\mu\text{m}$ , for example, with said thickness preferably lying in the range 5  $\mu\text{m}$  to 10  $\mu\text{m}$ .

The speed of rotation of the article is preferably about several rps when 5 the drop of paint or varnish is deposited on the surface on which it shall spread under the effect of the centrifugal force, e.g. 3 rps, and increases progressively to reach several dozens of rps during the spreading operation of the paint or varnish and drying operation, e.g. 50 rps.

## CLAIMS

1. A method of applying a coating such as paint or varnish on a article having at least one substantially plane or slightly convex surface, the method including operations consisting in:

5           - depositing a predetermined quantity of coating in the fluid state on the center of a surface of the article, and spreading it by causing the article to revolve,  
          - applying directly the coating on at least a portion of the remainder of the surface of the article.

10           2. A method according to claim 1, wherein the coating is applied directly to the entire surface of the article which is not covered by said predetermined quantity of coating spreading under the effect of centrifugal force.

3. A method according to claim 2, wherein the spraying takes place in a closed enclosure.

15           4. A method according to claim 2 or 3, wherein the spraying takes place simultaneously with rotation of the article.

5. A method according to any of claims 2 to 4, wherein the spraying is performed by means of a nozzle (6) whose positioning and orientation are adjustable.

6. A method according to any preceding claims, wherein a coating is used that is capable of being cured under the effect of ultraviolet radiation.

20           7. A method according to any preceding claim, wherein the article is constituted by a container lid or a stopper, said substantially plane or slightly convex surface being constituted by the top of the lid or stopper coated by direct application comprising the sides of the lid or stopper.

8. A method according to any preceding claim, wherein, when the coating that is to be spread under the effect of centrifugal force is deposited, the speed of the article is about several rps and wherein the speed reaches during the spreading phase of the coating under the centrifugal force, several dozens of rps.

5 9. A method according to any preceding claim, wherein the substantially plane or slightly convex surface is generally rectangular in shape when observed from above at the moment when it is set into rotation to spread the coating under the effect of centrifugal force, and wherein the means for applying the coating directly to the surface of the article comprise a nozzle that is downwardly inclined and situated  
10 slightly above the periphery of said substantially plane or slightly convex surface.

10. A method according to claim 1, wherein the coating is without organic solvant.

11. Apparatus for applying a coating such as a paint or a varnish on an article having at least one surface that is substantially plane or slightly convex, the  
15 apparatus comprising:

- a rotary support for rotating the article;
- a dispenser member for depositing a predetermined quantity of coating in the fluid state on a predetermined location of said surface; and
- means for applying the coating directly on at least a portion of the  
20 surface of the article that is not covered by the coating being spread under the effect of centrifugal force.

12. Apparatus according to claim 11, further comprising an enclosure within which the article is rotated and the coating is deposited.

13. Apparatus according to claim 11 or 12, wherein the means for applying the coating directly comprise a nozzle whose inclination and positioning are adjustable relative to the rotary support.

14. Apparatus according to claims 11 to 13, including means for exposing  
5 the article to ultraviolet radiation.

15. A painted or varnished article, including a substantially plane or slightly convex surface (3) covered by a coating spread under the effect of the centrifugal force and at least a portion of its surface covered by a coating deposited by direct application, preferably by delivery from a nozzle.

10 16. An article according to claim 15, wherein the thickness of the deposited coating lies in the range 3  $\mu\text{m}$  to 30  $\mu\text{m}$ , and preferably in the range 5  $\mu\text{m}$  to 10  $\mu\text{m}$ .

17. An article according to claim 15 or 16, constituting a container lid or a stopper.

## A B S T R A C T

A method of applying a coating such as a varnish or a paint on a hollow article. The method includes the operation consisting in depositing a predetermined quantity of coating in the fluid state on the center of a surface of the article, and in spreading it by causing the article to revolve.